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THE CENSUS METHODS OF THE FUTURE.

By E. Dana Durand, *late Director of the Census.*

The decennial census of 1910 differed from its predecessors chiefly with respect to methods of analysis and publication of the material. The inquiries on the schedules were not materially different from those ten years or even twenty years before, and the methods of collecting the statistics in the field also remained substantially unchanged. While there is room for still further improvenent in methods of presentation, the most important questions for the future are of a different character. Of first importance is the problem of more closely adapting the census statistics, as regards scope and as regards frequency, to the needs of the public. Next to this comes the problem of increasing the accuracy of the field work. Another somewhat less important question is that of securing adequate local utilization, particularly by states and smaller political units, of the statistical material obtained by the federal government.

In considering the scope and frequency of census inquiries and the methods of securing greater accuracy, it will be most convenient to take up the great branches of the census severally, while the subject of the local utilization of the data may best be considered with respect to all the branches collectively.

Population Statistics.

The scope of the population census is reasonably satisfactory. It is difficult to name any inquiry which ought to be added. In fact the schedule is already somewhat overloaded and there are several inquiries that might well be spared. Accuracy suffers from the burden placed upon the enumerator and the person answering the inquiries. Even with the aid of elaborate machines, the Census Bureau can scarcely hope to to keep within the limits of money and time fixed by law in tabulating the results of so many inquiries.

For the past three censuses, the population schedules have carried questions regarding the number of children born to each woman and the duration of marriage, but never has the

Census Bureau had time or money to tabulate the answers. Probably it would be best at the next census to drop these questions from the general schedule and to seek information regarding the fecundity of the population by means of selected cases—a method which should give fairly satisfactory results with reference to a subject of this character.

The new inquiries regarding mother tongue, which were introduced into the schedule in 1910 under a special amendment to the census act, were found to involve very serious difficulties both from the standpoint of accuracy and from that of expense. The difficulties as to accuracy, however, were partly due to the late passage of the amendment, as a result of which there was no time to provide separate columns for these inquiries on the schedule. One cannot deny the scientific importance of the subject of mother tongue or nationality; these inquiries should doubtless be retained, though perhaps confined to the natives of certain specified countries, particularly Canada, Germany, Russia, Austria, Hungary, and Switzerland. At the present census, the tabulations were made in such a way as to show the characteristics—sex, age, marital condition, illiteracy and the like—of the foreign born and of the native whites of foreign parentage as classified both according to country of origin and according to mother tongue. It may be necessary for the sake of economy to give up the one method of classification or the other in connection with the tabulations of these characteristics, while using both as regards mere number of persons.

A very material addition to the tabulation expense of the census of 1910 resulted from the insertion of an inquiry in the schedule with regard to the industry in which the person enumerated was employed, in addition to the inquiry as to his trade or occupation. The Census Bureau has so tabulated the returns as to show with respect to each industry the number employed in each different occupation. For example, the statistics will show the number of stenographers or the number of salesmen in the steel industry, in the cotton industry, and so on. This cross classification of scores of industries with scores of occupations involved an enormous amount of detail in tabulation; about eight thousand classes were distinguished for each of the states and the larger cities.

The inquiry regarding the industry can scarcely be dropped, but, for the sake both of reducing expense and of expediting the publication of results, a less elaborate method of tabulation may be advantageous. The least expensive plan would be to use the industry returns merely for the purpose of defining more clearly certain occupations, so that the tables would have only one principle of classification although the number of occupations would be somewhat greater than otherwise. However, with comparatively moderate additional expense, it would be possible to show also the number employed in each industry—perhaps with some detail regarding their sex, race, nativity, and parentage—but without cross classification, that is, without distinguishing each occupation within each industry.

Of all the inquiries on the population schedule, the two regarding unemployment probably bring the least satisfactory returns. There is much difficulty in defining what constitutes unemployment. Often the workingman—or his wife or lodging-house keeper who may answer for him—cannot remember just how long he was unemployed during the preceding year. Pride or other sentiments may lead to answers known to be false. Moreover, unemployment statistics, to be of much use, need to be taken annually. It seems desirable to attack this statistical problem by some other means than the decennial census.

In 1910, as at previous censuses, there were two inquiries on the population schedule with regard to literacy—ability to read and ability to write. One would be enough. The statistics regarding ability to speak English are of no great value. Ability to speak a few words may lead to an affirmative answer to the inquiry in one case, while in another, only habitual use of the English language may be considered the proper criterion.

The frequency with which statistics should be collected depends upon the rapidity with which continuing or "long-time" changes in the phenomena occur and upon the presence or absence of considerable short-time fluctuations. In general the changes in the relationships of the population—in its composition and characteristics—are slow and continue for long periods in the same direction. The absolute number of inhabitants, however, may change rapidly. The extraordinary rate of growth in certain sections of the United States and in many cities throughout all sections, together with the considerable variations in that rate from period to period, renders intercensal estimation of population exceedingly difficult. An approximately accurate knowledge of the number of inhabitants in each locality year by year is most important, especially for the sake of death and birth rates. The need for frequent enumeration is to some extent met by local censuses, state or municipal, but there is seldom much public confidence in the accuracy of enumerations other than those taken by the Federal government.

Were it necessary to create a new field force for each enumeration, as has been the practice in the past, one would hesitate to recommend that the Federal government take a quinquennial census of population; but if simpler and cheaper methods can be devised, an enumeration intermediate between the regular decennial censuses might wisely be introduced. Only a few inquiries would be needed at such an intermediate census.

There is much need of greater accuracy in the population census. With regard to the more difficult inquiries on the schedule, the omissions and errors are quite too numerous. For example, in the case of about one tenth of the foreign born population of the country, no report regarding citizenship was secured at the 1910 census, and for the same proportion returns as to the year of immigration were lacking. If, in so many cases, no information at all can be got, it must be that many of the answers which are made are erroneous.

There is no way of estimating the average margin of error in the census returns of the number of inhabitants. For the country as a whole, and in most states, it is probably small. The fact, however, that in more than twenty cities the Census Bureau discovered extensive "padding" of the returns for 1910, in some cases amounting to as much as 30 or 40 per cent., cannot but raise suspicion as to the accuracy of the figures for some other places where the vigilance of the bureau officials may not have succeeded in detecting the fraud. It is certain that in 1900 several cities padded their returns heavily without being brought to book. On the other hand, there were in 1910 eight or ten places in which, by reason of complaints of incomplete enumeration, a new count was taken and in four or five of these, the recount showed materially larger numbers, the additions ranging from 4 per cent. to 20 per cent.—the extreme figure being, however, for a small town. Complaints of under-enumeration are likely to be made only by places where comparatively little growth of population is reported by the enumerators. It is possible that in some cases where the rate of growth is fairly high, and therefore satisfactory to the community, the enumeration is nevertheless somewhat incomplete.

It may be that greater accuracy with respect to the number of inhabitants could be secured by substituting the *de facto* for the *de jure* principle in census enumeration; that is, by counting persons where they are found on the census day instead of counting them where they belong. The attempt to decide who belongs in a given place involves most difficult questions of judgment. The enumerator may undercount by omitting persons who, though not perhaps permanent residents of his district, nevertheless should be counted there because they have no place of permanent residence. On the other hand, perhaps in entire honesty, perhaps with intent to swell the population fraudulently, he may make the opposite error. The *de facto* system would remove all difficulties of judgment, and would probably also reduce the opportunities for fraud. The change should not be made without further careful study.

The most important source of inaccuracy in the population statistics, however, is the incompetence and negligence of many of the enumerators. The greatest promise of improvement appears to lie in the employment of mail carriers to collect census statistics. There seems no doubt of the feasibility of this plan in the case of the country districts (see below). The matter is not quite so clear in the case of cities. The city carriers are by no means distributed in proportion to population. The business districts, where there are comparatively few persons to be enumerated, have many mail carriers, while the densely populated districts occupied by the poorer classes have relatively few. It would seem possible, however, to meet this difficulty by assigning special assistants to the carriers in the densely populated districts, these assistants being either persons temporarily employed for census work only or carriers from other parts of the city.

It is possible that in the cities the use of the mail carriers as enumerators would necessitate the omission of one or more of the daily mail deliveries during the period of census taking. The importance of a correct census would, however, justify this temporary inconvenience. Were it not for the extremely heterogeneous character of the population of our cities and the presence of a great many who are unable to speak English, the families might be expected to fill out the census schedules themselves. In that case the work of the carriers would consist of little more than delivering the blanks and collecting them later, and the mail deliveries would not be much disturbed. This system of self-enumeration is quite generally successful in Europe. In 1910 the Census Bureau, chiefly for experimental purposes, tried the use of "family schedules" in the large cities, in addition to the regular schedules filled out by the enumerators. It was found, however, that no very great proportion of the families, particularly among the less educated classes, filled out the schedules. This was due in part to the fact that there was no compulsion to do so, but even with a compulsory provision in the law the difficulties in some sections of the cities would be serious. It will probably be worth while, however, to continue the use of this device, especially in case the carriers are employed as enumerators.

AGRICULTURAL STATISTICS.

In order properly to consider methods of improving the agricultural statistics of the Federal government, one must take into account the annual work of the Department of Agriculture as well as the enumerations by the Census Bureau, heretofore decennial only.

Many agricultural phenomena, unlike most phenomena of population, are subject either to rapid continuing changes, or to decided short-time fluctuations, or to both. Hence the need of annual statistics regarding the numbers of domestic animals, particularly food animals, and regarding the acreage and production of at least the major crops. A census taken once in ten years, or even once in five years, may fail utterly to show the true trend in these respects, because the census year may be by no means typical. Moreover, statistics of crops and of livestock are desired annually, and with great promptness, because of their effect on current prices, and on the conduct of business. The Census statistics of the past have been by no means adequate to the public needs from the standpoint of frequency.

This inadequacy, unfortunately, has not been satisfactorily remedied by the annual statistics of the Department of Agriculture. These, heretofore based solely on estimates, have been often so inaccurate as to be worse than worthless. This statement holds true, of course, only of the estimates regarding the numbers of domestic animals and the acreage and production of crops; the estimates regarding the condition of growing crops have perhaps been as good as could be expected in the case of matters necessarily of opinion.

It is understood that the new administration of the Department of Agriculture is considering the reorganization of its statistical work, and that in particular the use of the mail carriers to collect, not estimates, but actual returns at least of crop acreage is likely to be tested. It is needless, in view of the steps that are being taken, to criticize the errors of the past estimates or to make suggestions as to methods to be employed by the department in the future. It may be appropriate, however, to call attention to the bearing of this possible radical change in the methods of the Department of Agriculture upon the future of the agricultural census.

In the first place, the question naturally arises whether, if the Department of Agriculture decides to institute an annual enumeration—virtually a census—of certain important items, it would not be logical to turn over to that department also the more extensive decennial (or quinquennial) censuses of agriculture. Conversely, of course, the annual enumerations might be made by the Census Bureau. It would seem unfortunate not to utilize for both tasks the expert skill of the same body of statisticians and of tabulating clerks. In any case, duplication of work, with its possible conflict of data, should be carefully avoided.

In the second place, by whatever authority at Washington the enumerations are conducted, the rural mail carriers, if used to collect the annual returns, should by all means be used to collect also all other agricultural statistics. The training obtained in the former task would be invaluable to them in the latter. Herein, in fact, lies one of the chief arguments in favor of the substitution of actual annual enumeration, through the mail carriers, for the present method of estimating the number of animals and the acreage and production of crops. Not only could the annual data thus be immensely improved, but likewise all other agricultural statistics. It was chiefly in the belief that the mail carriers would get more accurate returns than enumerators chosen by the old methods, that the writer, in his last annual report as director of the census, urged their employment for the agricultural census which, under recent legislation, is to be taken in 1915. It may be remarked, parenthetically, that if annual enumerations of the principal crops and of domestic animals are inaugurated by the Department of Agriculture, the need for the agricultural census of 1915, which by law is confined to the same topics, will apparently disappear. It is possible, however, that the public will ultimately demand more detailed information regarding agriculture as often as once in five years.

The large margin of error which has heretofore existed in some phases of the agricultural census is partly due to the inherent difficulty of the inquiries and to the fact that few farmers keep records or accounts of their business. It will never—at least for a long time to come—be possible to secure complete and accurate returns regarding such a subject as dairy or poultry products. At the Thirteenth census, for example, less than four fifths of the farmers who reported dairy cows on their farms in April, 1910, reported the quantity of milk produced during the preceding year, and many of those who did report gave highly inaccurate returns. The inherent difficulties are much less in such matters as the numbers of animals or the acreage and production of the principal crops, but even as to these they are considerable. In all directions, however, a great gain in accuracy should result from the employment of more competent and responsible enumerators.

The mail carriers, who are chosen by civil service examinations, are on the average more intelligent than the enumerators secured by the methods heretofore used. It is naturally difficult to get competent men to take a temporary, and rather poorly paid job, like that of enumerator. Mail carriers have the advantage of personal acquaintance with practically every one in their districts. They would have a sense of responsibility owing to the fact that failure to perform their census work properly might result in loss of their permanent positions. They could, practically without loss of time, revisit the farms for which they had at first failed to secure information; enumerators heretofore have too often omitted such farms altogether, or made guesses for them. It goes without saying that if the rural mail carriers were to take the agricultural census, they should also take that of population in the country districts.

Aside from the gain in the accuracy of decennial census work which would result directly from the employment of mail carriers, accuracy might under this plan be further promoted in an indirect way. The system would permit a reduction in the number of inquiries covered by any one schedule. Instead of asking a multitude of questions in the one decennial year, part at least of the questions, aside from those asked annually, might be distributed through the intermediate years. A limited number of inquiries as to some particular topic such, for example, as the poultry business might be asked in one year, inquiries as to some other topic the next year, and so on, each topic being taken up again after an interval of ten years. Doubtless it would still be desirable to retain a larger number of inquiries, covering all the most important items of agricultural industry, for the year of the regular decennial census (1920, 1930, etc.), but more elaborate details could well be distributed.

Whether by this device alone, or by other means, or by a combination of methods, it is most desirable that the number of inquiries in the schedules used for the major, or decennial, censuses of agriculture should be greatly reduced. The schedule used in 1910, which was not much more elaborate than that of 1900, contained more than 500 inquiries. This multiplicity places an undue burden on even the most competent enumerator, as well as upon the farmer. It tends to increase the margin of error materially. Moreover, it necessitates the employment of a great temporary force of clerks in the census office, in addition to the large number who must be employed for population work. It also prevents prompt publication of the results.

A second method of relieving the decennial schedule of agriculture without loss of valuable information would be by addressing certain questions only to selected farmers—selected of course, strictly at random. It is surprising that the method of securing typical data, so common in various other branches of statistical work, should never have been applied to census statistics of agriculture. It would be peculiarly adapted to information regarding values. If one tenth, or even one twentieth, of all farmers, scattered throughout the country, were asked to report the value of their live stock, or of the various products of their farms, average values computed from these returns and applied to the numbers or quantities reported from all farms would give substantially correct total values. The omission of questions of value would alone reduce the bulk of the general agricultural schedule nearly one third. A combination of this plan with that of transferring part of the inquiries to other years would make possible a very great reduction in the burden on the enumerators, the farmers and the census office. In fact, it would permit the addition of some valuable inquiries which have heretofore been necessarily left untouched.

If neither of these last two somewhat radical changes in the methods of the agricultural census be adopted, then, no matter how competent may be the enumerators, the census schedule of agriculture should, in the interest of accuracy, be materially reduced by omitting altogether the less important inquiries. Space will not permit a discussion of the relative importance of the various questions. Few of them could be spared without considerable loss. The schedule of 1910, besides embodying the experience of past censuses as to the information desired by the public, was framed after long consultation of experts from the Department of Agriculture and from agricultural colleges.

The plan of employing mail carriers to make an annual canvass of the farms with reference to domestic animals and major crops will be somewhat more expensive than the present system of estimates used by the Department of Agriculture. The mail carriers will have to be paid, and the cost of tabulating the returns in Washington will be considerable. However, the cost will not, in all probability, reach half a million annually. The mail carriers would soon find it possible to have most of the schedules filled out by the farmers themselves, and the pay of the carriers would not need to be large. The increased reliability of the results would more than justify the cost even if the carriers performed only this annual work. When to this gain is added the greatly increased accuracy of the decennial census data which would follow from using the mail carriers, thus trained, to collect them also, there should be no hesitation in deciding in favor of the new plan. Moreover, it is probable that a fair compensation to the rural mail carriers for taking the decennial census would be less than the pay necessary to secure temporary enumerators; so that the aggregate cost, during a decade, of collecting statistics of agriculture and population in the rural districts might be little if any greater than at present.

To recapitulate, it seems desirable in the future: (1) to employ the rural mail carriers to collect all Federal agricultural statistics, and also to collect population statistics in the country districts; (2) to obtain annually, by actual enumeration, the numbers of domestic animals and the acreage and production of the principal crops; (3) to distribute part at least of those inquiries which need to be asked only at decennial (or quinquennial) intervals among the individual years of the decade (or of the five-year period); and (4) to rely upon data from selected farms for most information regarding values.

STATISTICS OF MANUFACTURES.

The greatest defect in the statistics of manufactures collected by the Federal government is the absence of annual data. The census of manufactures, taken once in five years, is the only governmental source of information. A second defect lies in the fact that the quinquennial census fails to disclose, even with respect to those phenomena which are not rapidly variable, much information which is eagerly desired by the public. The methods of collecting the census of manufactures, which are entirely different from those used for population and agriculture, are reasonably satisfactory. The margin of error as to the more important inquiries is not very great, for, although many of the smaller concerns give only approximate figures, most of the larger concerns, whose returns dominate in the totals, give accurate bookkeeping data.

The quantity and value of the annual output of many classes of manufactured articles is subject not only to rapid changes of a continuing character, particularly those due to the development of new industries, but also to decided short-time fluctuations. Statistics of quantities and values collected only once in five years may give a very misleading idea regarding the tendencies. Moreover, current statistics, promptly published, concerning the more important commodities are needed as a guide to business policies, not only of the persons manufacturing, dealing in, or consuming those particular commodities, but also, in some cases at least, of the entire industrial and commercial world.

Business men frequently complain of the delay in the publication of census statistics of manufactures. This delay is an almost inevitable result of the fact that the quinquennial censuses cover scores of thousands of insignificant establishments and include a large number of inquiries. In any case, however, prompt publication of the data obtained by quinquennial censuses would bring no very great gain, since month by month and year by year after publication the statistics regarding the more variable phenomena become increasingly obsolete. Nothing short of annual returns will meet the needs of the situation.

The importance of securing annual statistics is so great that it would, if necessary in the interest of economy, justify the substitution of decennial for quinquennial enumeration of those phenomena of manufacturing industry which either are of minor importance or which change with comparative slowness and uniformity. It would probably cost little more to collect a limited amount of important information during every year of the decade than it costs to take a single census of the present elaborate type.

In general, only three topics would need to be covered by an annual census of manufactures; namely, the quantity of products, the value of products, and the number of wage earners. For a few industries statistics of the quantity and cost of materials might be desirable. Moreover, information would be needed only with respect to the major industries and their more important products and materials. It would, of course, be interesting to those engaged in every individual industry to have annual data regarding it, but there would be no great gain to the general public from making the annual returns thus comprehensive. Finally, the trend of the major industries could perhaps be ascertained with sufficient correctness by canvassing only the larger establishments, say those which, together, have nine tenths of the business.

It should be possible, by careful selection of industries, products and establishments, to reduce the cost of collecting and tabulating annual statistics to a very reasonable figure, and also to permit that promptness of publication which alone would justify an annual canvass.

Promptness and economy could both be furthered by the plan of securing reports by mail; a plan already pursued with fair success by the Census Bureau in collecting annual data regarding forest products and by the Geological Survey in collecting annual returns from mines. A limited field force would doubtless be necessary to follow up delinquent establishments.

The demand for such annual statistics of manufactures is insistent. The Census Bureau and other government departments are constantly besieged for it by manufacturers, by publicists, and by the general public. Even though the cost might reach several hundred thousand dollars a year it would be money well spent. The system of annual returns should be inaugurated at the earliest possible date.

Whether or not the plan above suggested be instituted, somewhat radical changes should be made in the scope of the general censuses of manufactures and in the methods of presenting the results. There are, in this respect, two chief defects at present. The first is the lack of information as to the quantity and value of a great many important specific products. The other is the lack of definiteness and unity in many of the industry classifications.

The number of specific commodities manufactured in the country is enormous, and many individual commodities are of numerous grades and sizes, which need to be distinguished, particularly if any information of value is to be secured regarding average prices. The census schedules already call for the quantities and values of more than a thousand commodities, including most of those which are well standardized. As to the industries for which "special schedules," containing inquiries regarding specific materials and products, are used, the amount of detail now being secured is fairly adequate; indeed, in a few industries the details are perhaps unnecessarily numerous. There are, however, a good many industries, including several of great importance, for which no special schedules are used and no information regarding the quantity and value of specific products obtained. Notwithstanding the difficulties due to the multiplicity of products and to lack of standardization, a considerable extension of the inquiries in this direction should be attempted.

For example, the census furnishes us no information regarding the number of value of any class of machines, except agricultural implements, produced in this country. It tells us nothing with regard to the number of garments, other than underwear, made by the great clothing industries. There is no information concerning the number of articles of furniture of different kinds turned out. At least once in ten years, it would seem, the country should take a detailed account of its output of as many separate commodities as are of any material importance and as can practicably be distinguished.

The lack of clean-cut grouping of establishments into distinctive and unified industries is the natural result of the fact that many establishments overlap two or more branches of manufacture. With respect to statistics other than those of the quantity and value of specific products, each establishment canvassed by the census must ordinarily be classified, as an entirety, in some one industry or group. If an "overlapping" establishment—one which manufactures two or more different lines of goods—is classified as a whole according to its major product, the importance of the industry to which it is assigned is exaggerated, and that of some other industry or industries understated. In order to avoid this difficulty, the Census Bureau has heretofore tended more and more to combine related branches into larger classifications, into what are really industry groups rather than specific industries.

For example, nine classifications which were distinguished at the censuses of 1900 and 1905 were combined in 1910 under the one heading "Foundry and Machine Shop Products." This enormously comprehensive "industry" is so utterly lacking in unity that the statistics concerning it are of no real value to the public. Data for establishments making steam engines exclusively are totaled with those for establishments making printing presses exclusively, for establishments making elevators exclusively, for establishments making bells exclusively, and so on. There is no available information regarding the specific industry of making engines, or elevators or bells. Literally hundreds of the recognized industries of the country are entirely buried by this process of consolidation of related industries.

The demand for information regarding specific industries is a strenuous one. During the consideration of the recent tariff legislation, the Census Bureau was constantly being asked for information regarding such matters as the relation of wage payments and cost of materials to value of products for some specific industry as to which, under its method of classification, there were no separate data. It will never be possible to supply statistics—other, of course, than those regarding quantity and value of output—for the entire business of producing each separate class of commodities. The items for the overlapping establishments cannot be apportioned satisfactorily among the different branches of their business. It would, however, be possible to furnish information of great value by tabulating separately the statistics for those establishments which confine themselves, strictly or substantially, to each single class of products—in other words, for the typical establishments in each specific industry. While in some cases the "one line" establishments together may do less business in that particular line than the more comprehensive overlapping establishments, this is not usually true.

The plan suggested is merely that in the future the more heterogeneous industry groups now made by the Census Bureau, while retained as to their totals, should also be subdivided into more or less numerous specific industries with a residual group for the overlapping establishments. Naturally the quantity and value of each specific class of commodities distinguished in the special schedules would be tabulated for all establishments regardless of the particular industry to which assigned. This, in fact, is done at the present time by the Census Bureau.

If the various changes in methods above suggested should be found to involve undue expense, a counterbalancing saving could be made in another direction. The number of inquiries regarding the finances of manufacturing concerns—inquiries on the general schedule as distinguished from the special schedules—could be reduced. The Census Bureau has gone unnecessarily far into details in the past. It has called for several separate classes of expenditures and yet, after doing so, it has been forced to warn the public that to deduct the total for all the reported items of expense from the reported value of products would furnish no satisfactory information regarding the amount of profits, and that, if it did, the rate of profit on investment could not properly be computed because of the inevitable errors of the returns regarding capital invested. Except the items as to expenditures for wages, for materials and for fuel and power, the financial statistics are of little utility. Several inquiries which were included in the general manufactures schedule of 1900 and 1905 were omitted in 1910, not so much to reduce the amount of work as because it was considered practically impossible to obtain correct answers by the available census methods; but still further pruning may be worth while.

To recapitulate, it seems desirable for the future: (1) to provide for the collection annually and the prompt publication of statistics regarding the number of persons employed in the leading manufacturing industries and the quantity and value of their principal products, most of the data being secured by correspondence methods; (2) to take the more detailed censuses of manufactures (at least for the immediate future) only once in ten years; (3) to obtain at the decennial census statistics regarding the quantity and value of as many specific products as practicable; (4) to distinguish in the tabulations as many specific industries as possible; (5) to omit from the general schedules the items regarding capital and the items regarding expenses other than those for wages, for materials, and for fuel and power.

STATISTICS OF MINING.

The situation with respect to the Federal statistics of mining is entirely different from that with respect to the statistics of manufactures. The need for annual data has already long been supplied by the Geological Survey, which publishes the quantity and value of the minor as well as the major products, together with considerable information regarding the number of wage earners, the hours of labor, and the use of machinery. The problem of the classification of establishments presents no such difficulties as appear with respect to manufacturing establishments.

The object of the decennial census of mines, taken by the Census Bureau, is to obtain certain details regarding the conditions and methods of the various mining industries which are not obtained annually by the Geological Survey. A coöperative arrangement has been made by which duplication of work is almost wholly avoided. Some minor changes in the census schedules of mining and in the methods of compiling and analyzing the statistics may be desirable, but there is no apparent occasion for radical changes of policy.

LOCAL UTILIZATION OF FEDERAL STATISTICS.

As an incident to its work of obtaining statistical totals for the country as a whole or for large geographical units like states, the Census Bureau of course is in a position to compile corresponding statistics for every smaller locality in the country.

The Census Bureau has always been very liberal in its expenditure of funds for the local presentation of details. A large mass of information regarding population is presented for each county and even for each incorporated place of 2500 or more inhabitants. Hundreds of items are published regarding the agriculture of each county. Yet there is from many quarters a demand either for more details regarding areas for which some data are already published, or for statistics regarding still smaller areas than are now distinguished in the reports. For example, there was, at the late Census, an urgent request from several of the larger cities for somewhat detailed population statistics regarding areas smaller than the wards, which are the smallest areas heretofore distinguished. In some cases, the demand was even for statistics regarding individual city blocks. Again, from several states there came requests for statistics of agriculture by townships, the smallest local unit distinguished by the Census Bureau being the county.

The expense of tabulation is greatly increased when the totals for states or other large areas, instead of being obtained directly by adding the original returns, are obtained indirectly by assembling subtotals for smaller areas. For example, if there were no distinction of counties or cities in the population census, the cost of tabulating would be reduced greatly, perhaps as much as half. Cost of printing is similarly greatly increased by giving extensive local details. The Census Bureau is therefore between two fires. On the one hand, it is often criticised for the large expenditures in tabulating and printing local details; on the other hand, it is criticised for not furnishing still more such details.

It is clearly the duty of the Federal government in the general public interest to compile such local statistics as may be necessary for a correct understanding of the more general phenomena. The thorough student of some economic or social problem affecting the country as a whole is likely to need data for individual states, and may need them for sections of states, for individual cities, or for classes of cities. Nevertheless, there is a limit to the amount of local detail which possesses any material interest for persons outside the locality itself. On the other hand, the citizens of a given community may have real interest in, and need for, most elaborate statistical data regarding it.

It would seem logical that those details which are of little or no interest except to the people of a given locality should be tabulated, if at all, at the expense of the people of that locality. It would scarcely be possible or desirable in the future to throw upon local communities any part of the cost of tabulating and publishing such details as have hitherto been published at the expense of the Federal government itself. The tradition in favor of the present practice would be too strong to overcome. The Federal government, however, can scarcely be justified in itself incurring the expenditure necessary to present many more local details than have heretofore been presented. It is the more appropriate that the additional expense involved should be borne by the localities concerned, because the information desired by one locality often differs from that desired by another. There seems here a large field for coöperation between the Census Bureau and the states, or directly between that Bureau and individual cities or other political subdivisions of states. Certainly it seems a needless waste to compel states or local communities to duplicate the original work of collecting data which are already collected by the national government.

There are two general ways in which such coöperation might be effected. In the first place, the Census Bureau might furnish states or localities with duplicates of the original returns, the whole process of tabulation being performed locally. By the use of photographic and other modern methods the cost of duplication might be reduced to a minimum. In the case of statistics which are tabulated by means of punched cards, duplicates of such cards might be furnished, provided, of course, the local authorities had the necessary machinery for handling the cards. It would not be difficult to devise a punching machine which would punch two similar cards at one time with little added expense.

A second method of coöperation would be for the Census Bureau to perform the entire work of tabulating the added local details desired, charging the expense to the local authorities.

At the present time it is virtually impossible to adopt either of these two methods. To be sure, the law authorizes the Census Bureau to furnish copies of schedules to local communities or others at their expense, and this has been interpreted by the Bureau as authorizing it also to make tabulations for them at their expense. This provision is, however, practically unworkable, because the appropriation acts year by year expressly specify the number of clerks of each particular grade who can be employed. Consequently, even though the funds are available from outside sources, no additional clerks can be employed within the Bureau. During the three year "census period," when the number of clerks is not expressly limited, such outside work could perhaps be performed. It is probable, however, that, if it were done on a large scale, criticism from Congress would result, unless more specific legal authority were first secured. Consequently a prerequisite for satisfactory coöperation between the Census Bureau and local communities is further Federal legislation.

In most cases it would be more satisfactory to local communities which desired special statistical details to pay the Census Bureau for compiling those details than to tabulate them locally from duplicates of the original returns. The local authorities usually lack a skilled force of statistical clerks and experts, as well as the machines and appliances necessary for the most economical work. Perhaps in the course of time our states and our leading cities may develop efficient organizations for statistical work, but in the meantime the Census Bureau can tabulate statistics much more cheaply than the great majority of states or cities.

From the standpoint of the Census Bureau, on the other hand, there are difficulties in the way of performing tabulation work for outsiders. In the first place such special work is likely to cause delay in the more general tabulations. If totals to be published by the Census Bureau are compiled by summarizing subtotals compiled for others, more time is required than for direct tabulation; this is true no matter if additional clerks are employed and paid for by the local governments. In the second place it is practically impossible to distinguish the cost of local work from that of general work so long as the two are merged in one process. To do so necessitates an estimate, rough at best, of the cost which would have been incurred had a different method of tabulation been employed, and the subtraction of this estimate from the actual cost to determine the added expense.

There would be only one effective means of obviating these two difficulties. This would be by a practically complete separation of the work performed at local expense from that performed at Federal expense. This could be done, for example, in the case of population statistics by making duplicate cards for the inhabitants of any community which desired special details—the additional cost of duplicating the cards would be easily calculated—and turning these over to a separate force of machines and of clerks for tabulation. This plan would involve some sacrifice of economy. It would place a somewhat greater expense upon the locality than would be represented by its share of the joint cost of securing both kinds of results through one process. It would, however, in most cases, be materially less expensive than for the localities to attempt to tabulate the statistics themselves.